

1           1.       An imaging device comprising:  
2           an optical plate made of an optically transparent material and forming a surface for  
3 receiving a finger;  
4           a light source positioned to illuminate the finger receiving surface;  
5           an imaging system positioned to receive light collected from the finger receiving  
6 surface and to form an image of a fingerprint pattern of the finger based on the received light;  
7           in which the optical plate has an index of refraction less than 1.49.

1           2.       The device of claim 1 in which the optical plate material includes TPX.

1           3.       The device of claim 1 in which the optical plate material includes Butyrate.

1           4.       The device of claim 1 in which the optical plate material includes silicone.

1           5.       The device of claim 1 in which the light source is positioned at a second  
2 surface of the optical plate.

1           6.       The device of claim 5 further including a reflective surface positioned at a  
2 third surface of the optical plate to collect light from the finger receiving surface and to focus  
3 the collected light on the imaging system.

1           7.       The device of claim 6 in which the imaging system is positioned at a fourth  
2 surface of the optical plate.

1           8.       The device of claim 1 in which the optical plate has an index of refraction less  
2 than 1.44.

1           9.       The device of claim 1 in which the imaging system comprises:  
2 an aperture at a second surface of the optical plate;  
3 an objective at the aperture; and

4 a detector for receiving light collected by the aperture and the objective to form the  
5 image of the fingerprint pattern.

1 10. The device of claim 9 in which the imaging system comprises a reflective  
2 surface positioned between the objective and the detector for collecting light from the  
3 objective and for focusing the light onto the detector.

1 11. The device of claim 9 in which the detector comprises a CCD.

1 12. The device of claim 9 in which the detector comprises a CMOS sensor.

1 13. The device of claim 9 in which the aperture defines an aperture beam of light  
2 rays used by the detector to form the fingerprint pattern image.

1 14. An imaging device comprising:  
2 an optical plate made of an optically transparent material and forming a surface for  
3 receiving a finger having an index of refraction;  
4 a light source positioned to illuminate the finger receiving surface;  
5 an imaging system positioned to receive light from the finger receiving surface and to  
6 form an image of a fingerprint pattern of the finger based on the received light;  
7 in which the optical plate has an index of refraction less than the index of refraction  
8 of the finger.

1 15. The device of claim 14 in which the optical plate includes silicone.

1 16. An optical plate for use in imaging a fingerprint, the optical plate comprising:  
2 an optically transparent material that forms a surface for receiving a finger;  
3 a second surface for coupling to an imaging system that receives light collected from  
4 the finger receiving surface and that forms an image of a fingerprint pattern of the finger  
5 based on the received light; and  
6 a third surface for coupling to a light source that illuminates the finger receiving  
7 surface;

in which the optical plate has an index of refraction less than 1.49.

17. A method of imaging a fingerprint, the method comprising:  
 providing an optical plate made of an optically transparent material having an index  
 of refraction less than 1.49, the optical plate having a surface for receiving a finger;  
 receiving a finger at the finger receiving surface;  
 illuminating the finger receiving surface with a light source;  
 collecting light reflected from the finger receiving surface; and  
 receiving the collected light at an imaging system to form an image of a fingerprint  
 pattern of the finger based on the received light.

18. A method of imaging a fingerprint, the method comprising:  
 providing an optical plate made of an optically transparent material having an index  
 of refraction, the optical plate having a surface for receiving a finger;  
 receiving a finger at the finger receiving surface, the finger having an index of  
 refraction;  
 illuminating the finger receiving surface with a light source;  
 collecting light reflected from the finger receiving surface; and  
 receiving the collected light at an imaging system to form an image of a fingerprint  
 pattern of the finger based on the received light;  
 in which the index of refraction of the optical plate is less than the index of refraction  
 of the finger.

19. A method of forming an optical plate, the method comprising:  
 molding a silicone material into a base;  
 forming a reflective device; and  
 attaching the reflective device to the base to form a reflective interface between the  
 base and the reflective device.

20. A method of forming an optical plate, the method comprising:  
 forming a transparent hollow device having sides;

- 3           applying a coating to an inner surface of one of the sides to form a reflective surface
- 4   on that side;
- 5           dispensing silicone material into the hollow device; and
- 6           hardening the silicone material to form the optical plate.

07066-065001